Author’s response to reviews

Title: Prevalence and predictors of under-nutrition among school children in a rural South-eastern Nigerian community: A cross sectional study

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Reviewer reports:

Mark Anthony Myatt (Reviewer 1): I reviewed the previous version of this article. the authors have addressed most of the concerns that I expressed in my previous review.

I think the treatment of the sample as a simple ramdom sample is OK. I had previously misunderstood what had been done.

I have a remaining issue with the material on sample size. Using the information in the article:

"Sample size was derived from a single population proportion formula. We used vitamin A deficiency prevalence of 40% [10 11] at 95% confidence interval, 12.5% margin of error and non response rate to derive a sample size of 450".

I get:

\[ n = \frac{p \times (1 - p)}{(e / 1.96)^2} \]
\[ n = \frac{0.4 \times (1 - 0.4)}{(0.125 / 1.96)^2} \]
\[ n = 59 \]
not $n = 450$. With $n = 450$ the margin of error (i.e. the approximate half-width of the 95% CI) would be about a 4% (not 12.5%).

It is not clear how this type of sample size calculation is useful for this application. A better approach would be (e.g.) to calculate the sample size required to detect an effect (e.g. odds ratio) of a given magnitude. For example:

Number of controls per cases = 1.5 (i.e. 60% / 40%)

OR to detect = 2.5

Exposure in controls = 10%

alpha = 0.05

Power = 90%

gives $n = 460$ (184 cases and 276 controls). The author's could do this sort of calculation. Another approach would to test for a difference in proportions.

An alternative is to remove the sample size material and replace it with and illustrative power analysis.

It maybe that I misunderstand the authors' meaning. In that case some rewriting is also required.

I am not concerned about the overall sample size as $n = 450$ is not "small". My concern is that the procedure used to calculate the sample size is confusing and may be inappropriate.

**OUR RESPONSE**

The formula used for the sample size calculation is:

$$N = \frac{4P (1 - P)}{W^2}$$

Where $N =$ total number of children required for the study.
P = proportion of the population assumed to have abnormal vitamin A status.

W = required probability level taken for this study (0.05 or 5%).

Substituting into this formula with P=49.8%, we have

\[ N = 399.99 \approx 400 \]

5% non response rate = 20 giving a total of 420. This value was rounded off to 450 because the higher the sample size, the higher the precision.

This was how the sample size was derived and this is what we called single population proportion formula. Please see lines 146-149 of the revised manuscript.

Daniel Hoffman (Reviewer 2): None